

REMARKS

The Office Action dated September 30, 2008 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1-4, 6-19, 21-34 and 36-51 are presently pending and are respectfully submitted for reconsideration.

Applicant wishes to thank the Examiner for the interview conducted over the telephone on December 19, 2008. Applicants appreciate the Examiner's time and consideration.

Claims 1-4, 6-19, 21-34 and 36-51 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ketchum et al. (U.S. Patent No. 6,138,026) in view of Kuchi (U.S. Patent Publication No. 2002/0126648). The Office Action took the position that Ketchum discloses all of the claim recitations except for a communication channel that uses a non-orthogonal modulation matrix. The Office Action then relied on Kuchi to cure those deficiencies of Kethcum with respect to the claims. This rejection is respectfully traversed for at least the following reasons.

Claim 1, upon which claims 2-4, 6-15 and 47 are dependent, recites a method that includes determining a performance measure representing performance of a communication channel between a first transceiver and a second transceiver in a telecommunication system. The method uses an extended channel model which depends on a non-orthogonal modulation matrix. The communication channel comprises non-

orthogonal modulation by the non-orthogonal modulation matrix. The modulation symbols are distributed using at least two radiation patterns, the performance measure being sensitive to the modulation. The method also provides controlling the communication resources based on the performance measure.

Claim 16, upon which claims 17-19, 21-30 and 48 are dependent, recites an apparatus that includes a determiner configured to determine a performance measure representing performance of a communication channel between a first transceiver and a second transceiver in a telecommunications system by using an extended channel model which depends on a non-orthogonal modulation matrix. The communication channel comprises non-orthogonal modulation by the non-orthogonal modulation matrix. The modulation symbols are distributed using at least two radiation patterns, and the performance measure is sensitive to the modulation. The apparatus also includes a controller configured to control the communication resources based on the performance measure.

Claim 31, upon which claims 32-34, 36-45 and 49 are dependent, recites an apparatus that includes a performance measure estimator configured to determine a performance measure that represents performance of a communication channel between a first transceiver and a second transceiver by using an extended channel model which depends on a non-orthogonal modulation matrix. The communication channel comprises non-orthogonal modulation by the non-orthogonal modulation matrix. The modulation symbols are distributed using at least two radiation patterns, and the performance

measure is sensitive to the modulation. The apparatus also includes a controller connected to the performance measure estimator, the controller being configured to control the communication resources based on the performance measure.

Claim 46 recites an apparatus that includes means for determining a performance measure representing performance of a communication channel between a first transceiver and a second transceiver by using an extended channel model which depends on a non-orthogonal modulation matrix. The communication channel includes non-orthogonal modulation by the non-orthogonal modulation matrix. The modulation symbols are distributed using at least two radiation patterns, and the performance measure being sensitive to the modulation. The apparatus also comprises means for controlling the communication resources based on the performance measure.

Claim 50 recites an apparatus that includes a performance measure estimator configured to determine a performance measure that represents performance of a communication channel between a base station and a mobile station by using an extended channel model which depends on a non-orthogonal modulation matrix. The communication channel comprising non-orthogonal modulation by the non-orthogonal modulation matrix. The modulation symbols are distributed using at least two radiation patterns and the performance measure is sensitive to the modulation. The apparatus also includes a radio frequency part configured to transmit the determined performance measure to the base station for controlling communication resources.

Claim 51 recites an apparatus that includes a controller configured to receive a performance measure that represents performance of a communication channel between a first transceiver and a second transceiver by using an extended channel model which depends on a non-orthogonal modulation matrix. The communication channel comprises non-orthogonal modulation by the non-orthogonal modulation matrix. Modulation symbols are distributed using at least two radiation patterns. The performance measure is sensitive to the modulation, and control communication resources based on the received performance measure.

As will be discussed below, the teachings of Ketchum and Kuchi fail to disclose all of the elements of the claims, and therefore fails to provide the features discussed above. The rejection is respectfully traversed for at least the following reasons.

Ketchum and Kuchi do not disclose or suggest “determining a performance measure...the performance measure being sensitive to the modulation...and controlling the communication resources based on the performance measure”, as recited, in part, in independent claim 1, and similarly in independent claims 16, 31, 46, 50 and 51. The Office Action admitted that Ketchum does not disclose all of the above-noted features of the claims. However, Applicants disagree that Kuchi cures those deficiencies of Kethcum with respect to the subject matter recited in the claims.

The Office Action alleged that page 15, paragraph [0171] of Ketchum discloses “the performance measure being sensitive to the modulation”, as recited in the claims. Applicant disagrees and submit that Ketchum discloses transmission of channel state

information (CSI) from the receiver back to the transmitter. paragraph [0171] discloses modulation of the CSI but not dependency, i.e. sensitivity, of the CSI on the modulation. In other words, paragraph [0171] simply discloses a conversion of the CSI into modulation symbols, and does not disclose that the modulation affects the values of the CSI (emphasis added). To the contrary, the modulation is sensitive to the CSI in the sense that the actual symbol values modulated would depend on the values of the CSI.

If the CSI parameters disclosed in Ketchum were interpreted as being sensitive to the modulation simply because the signal received was modulated for transmission from the receiver to the transmitter, then the word “sensitive” is not being interpreted correctly by the Office Action and the claim is not being read and interpreted as a whole. Claim 1 recites that the performance measure is “sensitive to the modulation” which refers to the non-orthogonal modulation used to determine the performance measure. Accordingly, the modulation in the context of the claim recitations refers to the modulation included in the communication channel model from which the performance measure is determined. In order to disclose that the CSI includes “sensitivity” to the modulation, the CSI should be sensitive to the modulation used by the transmitter (not the receiver), and Ketchum is silent regarding the CSI being sensitive to the modulation used by the transmitter.

Ketchum does not disclose any modulation being used that would affect a performance measure, such as, the bit error rate (BER) or CSI. At best, Ketchum would modulate a signal simply for transmission between systems 310 and 350 (see FIG. 3 of Ketchum). Ketchum does not disclose a “performance metric” (i.e., bit error rate) used to

perform the resource allocation (i.e., selection of the modulation and coding scheme). Claim 1, for example, recites “determining a performance measure...the performance measure being sensitive to the modulation...and controlling the communication resources based on the performance measure.” In other words, Ketchum does not disclose a “performance metric”, such as, BER, as the performance measure for use in the resource allocation.

The Office Action alleged that the CSI parameters are comparable to the “performance metric” recited in the pending claims. Applicant submits that the example CSI parameters disclosed in Ketchum include signal-to-noise ratio (SNR), power control information, various signal-to-interference-plus-noise ratios (SINRs), a data rate indicator selected on the basis of the SNR, and a channel gain. None of these examples of “CSI” parameters would be affected by the modulation used to modulate a signal for transmission.

Referring to the examples of CSI, for example, SNR is simply a signal measured against the amount of noise in the background, such as, additive white Gaussian noise (AWGN) a.k.a. “noise.” Power control and power levels of a signal are not considered in light of the type of modulation, as the amplitude of the signal may be modified by increases or decreases to the power regardless of the modulation used. A data rate indicator is simply control data itself that is used to indicate information used to represent the data type. Lastly, channel gain is a parameter used to indicate the amount of gain

measure in the channel as a whole so that the operating conditions of the channel are recognized by the transmitter and receiver pair.

As noted above, the various examples of CSI parameters all operate independently without any affect from the modulation used to propagate the transmitted signal. Regardless of the modulation used for signal transmissions disclosed in Ketchum, the modulation is performed independently of the measured CSI parameters. Furthermore, in Ketchum the modulation is removed via demodulation prior to measurements being performed on the signal and is again re-modulated after the CSI parameters are measured (see paragraph [0171] of Ketchum and modulator/demodulator pairs 322a, 322t...352a and 352t of FIG. 3) (emphasis added). Certainly, the demodulation and modulation being performed prior to and/or after the CSI parameters are measured is a clear indication that the CSI parameters are measured without regard or “sensitivity” to the modulation used.

In addition to the above-noted deficiencies of Ketchum, Kuchi further fails to cure the deficiencies of Ketchum with respect to the pending claims. Kuchi discloses using a transmit diversity system that includes a base station 104 and a receiver 108 (see FIG. 1 of Kuchi). A stream of complex symbols is allocated to the transmitting device, which includes signal replications, such as, a complex conjugate and a negative complex conjugate of the signal symbols. A parallel transmission is temporally divided into time symbol periods. The transmitting devices of the transmit diversity system may transmit the complex symbol signals in parallel.

Kuchi further discloses using a non-orthogonal modulation with a non-orthogonal modulation matrix to perform the transmissions, however, Kuchi fails to disclose or suggest “determining a performance measure...the performance measure being sensitive to the modulation...and controlling the communication resources based on the performance measure”, as recited, in part, in independent claim 1 and similarly in independent claims 16, 31, 46, 50 and 51.

Accordingly, Ketchum does not anticipate the above-noted feature of the performance measure being sensitive to the modulation. Furthermore, this feature is not obvious from the disclosure of Kuchi or from any other reference, because none of the references provide any disclosure or suggestion that the transmission modulation could be determined by the performance of the modulation in that channel. Kuchi only discloses a non-orthogonal modulation by a non-orthogonal modulation matrix, and provides no disclosure for the dependence of the performance measure of the communication channel being sensitive to the modulation.

In the disclosure of the present application, the feature of the performance measure being sensitive to the modulation is described on paragraph [0088] of the specification. Accordingly, Ketchum and Kuchi do not take into account the effect of the modulation when evaluating the performance of the communication channel. Ketchum simply defines the state of the channel and selects a preset transmission scheme for the channel. The present disclosure enables direct comparison of different transmission modulation

methods in the communication channel, and provides more accurate selection of an optimal transmission modulation for the current communication channel.

Therefore, Applicants submit that Ketchum and Kuchi fail to teach or suggest all of the subject matter of independent claims 1, 16, 31, 46, 50 and 51. By virtue of dependency, Ketchum and Kuchi also fail to teach the subject matter of those claims dependent thereon. Withdrawal of the rejection of claims 1-4, 6-19, 21-34 and 36-51 is kindly requested.

Claims 3, 18 and 33 were rejected under 35 U.S.C. §103(a) as being unpatentable over Ketchum in view of Kuchi and further in view of Cheng et al. (U.S. Patent No. 6,411,817). This rejection is respectfully traversed for at least the following reasons.

Ketchum and Kuchi are discussed above. Cheng discloses a method for controlling downlink power in a time-division multiplex wireless system. The method may provide different downlink transmit signal powers to different time-division multiplex channels of a single carrier. A base station receives a measured signal parameter data for a downlink transmit signal of a time-division multiplex channel. The base station determines an initial adjustment for the downlink transmit signal power of the time division multiplex channel if the measured signal parameter data differs from a target signal parameter data. The base station determines a revised adjustment for the downlink transmit power of the time division multiplex channel based on the initial adjustment and at least one adjustment range as appropriate to achieve synchronization of the demodulation of the downlink transmit signal.

Claims 3, 18 and 44 are dependent upon claims 1, 16 and 31, respectively, and contain all of the limitations thereof. As discussed above, Ketchum and Kuchi fail to disclose or suggest all of the elements of claims 1, 16 and 31. In addition, Cheng fails to cure the deficiencies in Ketchum and Kuchi as Cheng also fails to disclose or suggest “determining a performance measure...the performance measure being sensitive to the modulation...and controlling the communication resources based on the performance measure”, as recited, in part, in independent claim 1, and similarly in independent claims 16, 31 and 46.” Thus, the combination of Ketchum and Kuchi and Cheng fails to disclose or suggest all of the elements of claim 3, 18 and 44. Furthermore, claim 3, 18 and 44 should be allowed for at least their dependence upon claims 1, 16 and 31 and for the specific limitations recited therein.

For at least the reasons discussed above, Applicants respectfully submit that the cited references fail to disclose or suggest all of the elements of the claimed invention. These distinctions are more than sufficient to render the claimed invention unanticipated and unobvious. It is therefore respectfully requested that all of claims 1-4, 6-19, 21-34 and 36-51 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant’s undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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